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ABSTRACT

Research has revealed that more males than females participate in computer learning environments. Rural young women in home and school are conditioned to accept outdated role definitions and may be limited in career and life choices by restricted access to technology and their perception of the female role in technology. In 1988-89, a year long in-service training program was developed for Kansas teachers to enable them to provide gender equitable, quality computer education in upper elementary and middle school classrooms. Designed primarily for schools in rural areas, the classroom segment was divided into two sections: a primary computer content section using Logo Writer, database building, lesson plans involving software, the computer language BASIC, and telecommunications software; the gender equity training section utilized the book, "Neuter Computer" (Sanders and Stone, 1986). An evaluation was conducted to assess the effects of the program on skills and attitudes of teachers and students. The results showed teachers had more equitable attitudes and female students showed increased use and enjoyment of the computer. (NL)

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Girls, Computers, and Amber Waves of Grain: Computer Equity Programming for Rural Teachers

Presented by
Linda P. Thurston
Kansas State University, Manhattan KS
for National Women's Studies Association Conference, 1989

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Rural Schools, Equity, and Computers.

Evidence abounds concerning the extent to which the world of technology is a male world. A front page story in the New York Times in February, 1989, proclaimed "Computing in America: It's a Masculine Mystique." That males and females have unequal access to an interest in computers is well documented; many studies demonstrate a pattern of sex differences in computer use, levels of interest, and achievement in programming skills. Hawkins (1984) speculates that these differences are deeply rooted in factors such as the expectation of different life goals for boys and girls, the situations and the organization of the classroom settings, the structure of learning tasks, the impact of societal images on girls, and the nature of the feedback in performance situations. The fact that computers tend to be subsumed under math and science may also be a problem. More males than females participate in computer learning environments (Linn, 1985). Females are as interested in computers as males once they enroll in classes, but teachers reported significant male/female differences related to interest in a commitment of programming tasks (Hawkins, 1984). Females are poorly represented in courses which have the greatest potential for high cognitive development. All the studies reported here were were done with urban or suburban groups.

Rural schools comprise most of the nation's schools and a majority of school districts are rural, with rural teachers educating 1/3 of the student population. Although transportation and telecommunication have

reduced some of the differences between rural and urban areas, there is an increasing gap between urban and rural in areas such as fewer resources, higher poverty rates, lower incomes for women, and lower youthful aspirations in rural areas. Rural young women remain victims of cultural lag, where home and school continue to condition them to accept a role definition that is no longer valid. The rural young woman's view of herself, her life, and her career may be partially circumscribed by access to technology and her perception of her role in technology.

Less computer access in rural areas and fewer resources for learning about technology will handicap rural students as compared to their metropolitan counterparts. A recent study showed that 80% of the 2000 largest, most financially capable schools used computers for classroom instruction while only 40% of the smaller, poorer schools did (Mathews & Winkle, 1982).

Conversely, there are other characteristics of rural America which indicate a positive prognosis in developing educational equity, if done properly. Deborah Fink (1986) characterizes most rural Midwestern communities as strong in the belief in independence and free enterprise, as having a strong work ethic, a sense of trust, the feeling of community, and high levels of volunteerism. Paul Nachtigal (1982) studied commonalities with urban schools (see figure 1). These represent strenghts of rural communities as they relate to providing quality and equitable programs in computer education for elementary and middle school children. Doris Helge (1981), who has studied rural special education for nearly a decade, says the major characteristic of

rural america is diversity, in terms of geography, values, cultures and sub-cultures, and strengths and challenges (see figure 2).

In rural areas, there is less access to computers and fewer resources for learning technology (Anderson, 1984). Rural teachers who are interested in computer education and/or gender equity have few resources to learn specific strategies to assure quality and equitable computer learning for boys and girls in their classrooms. These are specific rural barriers to computer gender equity which are added to the commonly acknowledged barriers of stereotyping of the content (Lockheed and Frakt, 1984), educational methodology (Turkle, 1984; Kersteen, 1986), sex-differentiated software (Slesnik, 1985), and location of computers in the school and in the home (Lockheed & Frakt, 1984; Miura, 1986).

Rural Computer Equity Project.

The directors of the Rural Computer Equity project in the College of Education at Kansas State University, Linda P. Thurston, Diane McGrath and Hilary McLellan, worked during the 1988-89 academic year to develop a program to train practicing teachers in rural Kansas to provide quality and equitable computer education in their upper elementary and middle school classrooms. In Kansas, 91% of the schools districts are labeled small, of which 75% are called very small. Providing innovative educational programs and assuring equity in those programs presents special problems and challenges to these rural areas. Isolation, low tax bases, problems of recruiting and maintaining quality teachers, and such rural attitudes as resistance to change, and suspicion of outside influences are characteristics of rural areas mentioned by Nachtigal

(1982) and Helge (1981) which impact on educational equity and on the utilization of new technology in education.

This paper will describe a model to train practicing teaches in rural areas to assure computer literacy in upper elementary and middle school girls in their classrooms. Special materials developed to demonstrate computer applications in rural areas, successful strategies and utilization of existing materials are included in the program model. In addition, a unique delivery system which delivers the curriculum to practicing teachers in rural areas will be described.

The goal of the project was to provide information and opportunity for the students to develop and implement computer equity strategies in their classrooms and school systems. The assignments were purposefully non-specific because of the differences in the students, their communities, and the schools in which they taught. These dictated that their projects would be very different from each other.

The content of the year-long inservice training program was divided into two sections, computer training and gender equity training. The primary content of the computer training was: LogoWriter, evaluation of software, building a database, lesson plans involving software, the computer language BASIC, and telecommunications. The gender equity training consisted of utilizing the book, Neuter Computer (Sanders and Stone, 1986), and several research articles. The class focused initially on these questions: Why is computer equity important? and, What can the teacher do to promote computer equity in the classroom and school system?The student requirements of this part of the training were: parent or community involvement; a research project; a journal of

strategies, or ideas used in the classroom; a telecommunications, data base, or cooperative learning project; and a planning book of future ideas.

The project expected students to learn about successful strategies from the text, from class, and from each other. During the semester they developed, adopted, adapted, or invented new strategies that fit their unique situations. The students also shared their ideas with other during whole groups class settings and during regional group meetings. Project participants evaluated their strategies for confirmation that they did indeed promote equity. During the second half of the training, this class provided the opportunity to apply the learned computer skills for better and equitable computer training in their classrooms.

The teachers suggested these and other strategies for exposing students to equitable computer learning opportunities, and for promoting female interest in computers:

a. screen software for gender/ethnic bias
b. recruit females for computer courses and activities
c. educate parents and teachers of the importance of equity
d. capitalize on peer relationships (cooperative activities)
e. incorporate computers throughout the curriculum
f. provide equal access (not first come, first served)
g. actively encourage female interest in computers
h. use computers as mean to an end
i. reflect many types of computer use.

Teacher Traing Delivery System.

The delivery system had to be unique to meet the needs of rural teachers. Project participants were from all over the state (see figure 3). Aspects of the program included moveable training sites, the use of electronic bulletin boards, and interactive telecommunications. The interactive telecommunications used was TELENET, a state-wide audio teleconferencing system at 36 permanent sites in Kansas equipped with high quality microphones and public address speakers. The group "met" six times during the year via TELENET. Guest speakers over the Kansas TELENET system included Mary McGinnis of the Women's Action Alliance, the New York State Computer Equity Project; and Kay Gilliland, director of EQUALS in Mathematics and Technology at the University of California, Berkeley.

Individual Equity Activities.

Project participants produced a diverse array of projects and suggestions, which included: a class in which computer students taught an older math class to do geometric figures using logo-writer, a mother-daughter breakfast and computer session, an in-service of other teachers, a game of inter-school question/answer tag over the electronic bulletin board, a newsletter produced by special education students, and a parent night with equity discussion and children teaching parents computer skills. An example of the journal project is depicted by figure 4, which was sent to the project staff via electronic bulletin board.

Program Evaluation.

To evaluate the program, a study project was conducted to assess the effects of participation in the program on the skills and attitudes of the teachers and their students. Project staff visited the classrooms of all the participants and at the same location, visited classrooms of children at the same grade levels as those taught by teachers in the project. They interviewed two boys and two girls per classroom, asking them two questions, "Do you think you will use computers in the future and, if so, how?" and "Do you want to learn more about computers and, if yes, what?"

Seventy-one experimental children, 5th through 8th graders (36 boys, 35 girls), were interviewed. Also interviewed were 22 boys and 20 girls whose teachers did not participate in the computer equity project, making a total of 42 children in the control group. The results of these interviews is found on figure 5. While both boys and girls listed a diversity of ways they would use computers in the future, girls named specific occupations twice as many times as boys. Figure 6 shows specific responses to two questions by girls and boys in the program classroom.

Following completion of the computer equity training program, teachers were asked to list reasons for gender equity in computer use. They listed many reasons for equity endeavors. These are listed in figure 7.

The final evaluation consisted of a pre-post examination of teacher attitudes, using the rating scale in the Neuter Computer. Teachers showed more equitable attitudes regarding student use of the computer

and reported increases in their female students' attitudes and use/enjoyment of the computer including: uses the computer intensely, happy to work alone, and unafraid to show computer ignorance. The teachers also reported improved attitudes of boys in the area of programming.

Equity is an important issue in rural areas. Reaching teachers in the field requires unique strategies. Providing information and opportunities to develop and implement equity strategies must consider the strengths and challenges of rural areas. The prognosis for change in teacher attitudes and behavior in teacher attitudes and in the behavior of their students is good.

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Figure 1

ISSUES DIFFERENTIATING RURAL & URBAN SCHOOL DISTRICTS

RURAL	URBAN
Personal/tightly linked communities	Impersonal/loosely coupled communities
Generalists	Specialists
Homogeneous	Heterogeneous
Nonbureaucratic	Bureaucratic
Verbal Communication	Written Memos
Who said it	What's said
Time measured by season of the year	Time measured by time clock
Traditional values	Liberal values
Entrepreneur	Corporate labor force
Make do/respond to environment	Rational planning to control environment
Self-sufficiency	Leave problem solving to experts
Poorer (spendable income)	Richer (spendable income)
Less formal education	More formal education
Smaller/less density	Larger/greater density

Nachtigal, 1982

Figure 2

ISSUES DIFFERENTIATING RURAL & URBAN SCHOOL SYSTEMS
AS THEY SERVE HANDICAPPED

	RURAL	URBAN
Transportation	Long distances High Costs Geographical barriers	Desegregation Issues
Community Structure	"Community Spirit" Personalized environment	Depersonalized environment
Geography	Remoteness causes isolation barriers, long distances from services	
Communication	Person to person	Memos
Professional Approach	Generalist	Specialist
Population Density	Sparse	High
Cooperation	Inherent	"Turfdom"

Helge, 1983

Figure 3

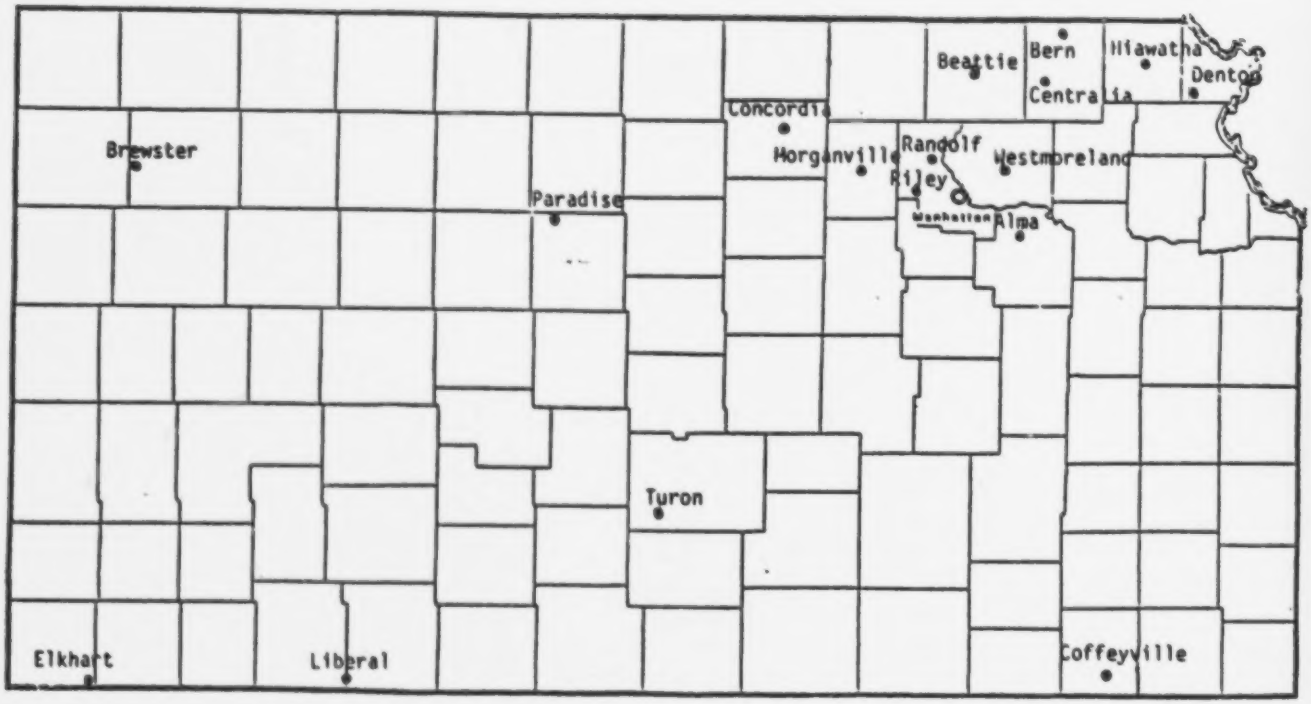
Beattie
Bern
Hiawatha
Centralia
Denton
Concordia
Brewster
Morganville
Randolf
Riley
Westmoreland
Paradise
Manhattan
Alma
Tyron
Elkhart
Liberal
Coffeyville

Figure 4

W.E.E.A. PROJECT (JOURNAL ON COMPUTER USES)

January 14, 1989

We will begin a special project after school to look at direct training of elementary students in computer applications. We started with the three girls we see & asked each of them to pick a peer to work with. This bases was designed to service two factors; computer use & social applications.

Parental support & student interest is very high but the biggest problem is adminstration support. Perhaps next year we can approach the District adminstration about setting up this type of program during study periods.

****

January 20, 1989

Keyboarding should be formally taught to young students. The "Computer Club" members seemed to enjoy several of the key-boarding activities. These could be both on computer & off computer. Increased speed in data entery will increase the student's profeciency with computer use. We copied disks for the club members and let the students take them to their own classrooms. Perhaps next year we could work with the regular education teachers to allow peer tutoring on specific software applications.

****

January 25, 1989

We used a packaged data-base in Social Studies based upon the Presidents. This activity showed the students how data can be organized. The use of data-bases could be expanded to include numerous students' inputs.

****

February 1, 1989

This week we made each student their own FrEdWriter disk. We have begun a daily log activity in English and with several of the students who are having some serious emotional problems, they were unwilling to express their thoughts on paper but were very willing to enter these same concerns on computer. The problem now is security. Somehow we need to made access secure so others are not able to gain access without permission.

****

February 6, 1989

The "Computer Club" worked on word-processing this week. We again made FrEdWriter disks for them to share with the other classrooms. The limitations of this program are many but for this age of student it makes a very good begining.

Perhaps next year we can issue each classroom a disk and can use as a building pen-pal activity. This could also be done with the use of modem.

****

February 13, 1989

We had a student move away this week, we used some of the graphic programs, i.e. Print-Shop to make a card for her. The students really liked doing this. We could use on a building wide situation to recognize special days, these should be student constructed. Perhaps include this as a classroom job which would be included in the classroom token economy.

****

February 17, 1989

Discovered an I.T.V. video program, "Computer Literacy", which does a very good job in covering the basics of computer applications. I think if we make this with "Computer Break" we could provide a great video background to systematic instruction of skills in a pleasant format.

Figure 5

STUDENT INTERVIEWS

	Participating	Non-participating
Girls	1. Will use? Yes 94% No 3%	1. Will use? Yes 80% No 5%
	2. Know more? Yes 97% No 3%	2. Know more? Yes 90% No 0%
Boys	1. Will use? Yes 78% No 17%	1. Will use? Yes 59% No 23%
	2. Know more? Yes 94% No 3%	2. Know more? Yes 86% No 0%
Total	1. Will use? Yes 86% No 8%	1. Will use? Yes 69% No 14%
	2. Know more? Yes 96% No 1%	2. Know more? Yes 88% (95%) No 0%

Figure 6

EXPERIMENTAL GIRLS

How will use?

- Like taxes and stuff
- Financial problems
- Do college work
- For financial stuff
- Teaching
- For checks or as a teacher
- To be a lawyer
- To be a scientist
- Lots of stuff, probably about everything
- Accountant
- To be an astronaut
- For work and stuff, I will be a lawyer
- Mess around with
- I want to manage a business
- To organize
- Write reports

What know more about?

- How to start it and put programs in
- Go fast on keys
- How to program
- How to make big posters

EXPERIMENTAL BOYS

How will use?

- Carpentry
- Architecture
- Farm work
- To figure out cures for sickness
- To keep track of farming inventory and things like that
- To keep stuff and like dad does
- Talking with others on national computer system
- Keep track of taxes
- To cheat on math
- Just to play

What know more about?

- How to solve problems
- How to be an accountant or banker
- Learn how to play the really hard videos and to work for the government
- To see what's going on in the world
- Everything

Figure 7

Reasons teachers give for gender equity for computer use:

- to break down female sterotypes
- advertisements / journals discourage girls
- all students can benefit from computer use
- all students need to have complete choice in career ideas
- unaware of choices for females in computer related careers
- women are competing with men in the work place - need same skills
- students need to know there are choices other than the one their parents made
- need to capture and maintain interest of girls in math / science
- boys tend to hog computers if allowed
- some boys feel typing is for girls
- equity in all areas important
- females being left behind in computer expertise
- the need to develop male / female interaction on an equal footing